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GUY P. JONES
EDITOR

Pest Control in Rural Areas

By EDWARD T. ROSS, Chief, Bureau of Sanitary Inspections

There are many common pests encountered by health officers in rural areas as well as in cities. Formulas have been devised for combatting such pests, many of which are successful, but no claim is made that any one formula is ideal for use under all conditions and circumstances. In California, however, many such formulas have proved successful under varying conditions, and health officers have found them suitable for use under their own particular local conditions. Copies of such formulas may be obtained upon application to the California State Department of Public Health.

Because of the part that rodents have played in the production of disastrous epidemics in California, it would seem reasonable to place rodents first on the list to be discussed.

In rural areas, ground squirrels are of great importance in the spread of plague. Among rodents, in which plague has been discovered, in California, are ground squirrels, golden mantled squirrels, flying squirrels, chickaree squirrels, Oregon squirrels, chipmunks, wood rats and field mice.

Two methods of control are applicable in the eradication of these rodents—chemical poisons and poisonous gases. Of course, it is useless to scatter poisonous grain about the burrows of rodents when fresh green feed is available. It is also unwise to use poisonous gasses during the dry season except under conditions

where the soil is of a nature that the gas may be retained in the burrows.

Strychnine and thallium sulphate are the chemical poisons most often used. In some few instances, however, phosphorus may be applied.

In the preparation of the poisoned material, various kinds of grain, such as hulled barley, red oats or hulled oats, are used. In the distribution of poisoned grain within infected areas care must be taken to be certain that it is properly placed so as to avoid endangering wild life and domestic stock. Where necessary, as in sheep pastures, barnyards, and such places, poison should be placed directly in the burrows.

In gas control, carbon disulphide, calcium cyanide or methyl bromide are the chemicals best suited for this work. In the application of carbon disulphide, two methods are employed—the chemical is either pumped directly into the burrow by means of a small pump, with hose, or by the application of what is known as the waste ball method. In this method, burlap, waste or other absorbent material is rolled into balls about the size of a large duck egg, soaked in the carbon disulphide and dropped into the burrow. The material is then ignited. Care should be exercised in this procedure, as, in most cases, the ignition of one burrow will explode the material placed in all connecting burrows. There is also a fire hazard.

This chemical may be used with good results without ignition. In the use of either method, not less than two ounces of the chemical is necessary in the treatment of each burrow. The entrance of all burrows treated must be tightly sealed with earth.

CALCIUM CYANIDE (CYANOGAS METHOD)

This chemical is forced directly into the burrow by means of a specially built pump. This method forces a cloud of the material throughout the burrow system, and it also destroys fleas. Entrance to all treated burrows must be closed with earth immediately.

METHYL BROMIDE

This chemical is applied by means of a small metal cylinder, equipped with a control and measuring device. After passing through the measuring device, the chemical flows through a short hose directly into the burrow. About 10 cc of the material is used in the treatment of each burrow. Entrance to burrows should be closed as in the use of other chemicals.

In most cases rodent control work is seasonal. Therefore, it is of the utmost importance that the habits of rodents in various localities be carefully studied in order that proper control work may be instituted.

In practically all areas of the state during the summer months strychnine treated grain is used in control. In the spring and fall months, when moisture is present, and for follow-up purposes, grain treated with thallium sulphate is much more efficient. Gas control activities are usually carried on during the winter season, when the ground is in condition to retain the gas. However, there are areas where satisfactory results may be had in the use of cyanogas or methyl bromide during the summer months.

Shooting is little value in so far as the actual control of rodents is concerned. However, it helps in cleaning up the few remaining rodents in areas where intensive control work has been carried on. In most cases, a 22 rifle is used for this purpose. In collecting rodents for examination, shotguns of suitable gauge, as No. 12 and No. 410, are more efficient.

RATS

There is no special season for rat control. Rats breed throughout the entire year and there must be no relaxation in activities to exterminate rats, either in summer or winter. There are three species of rats commonly found in this state—the English black rat, the Egyptian gray rat, and the common Norwegian brown rat, frequently called the barn or sewer rat. The chief difference among them lies in the fact

that the Norwegian brown rat burrows into the ground, while the English black rat and Egyptian gray rat live in nests established above the ground, generally at high elevations. These rats have often been found living in the crowns of palm trees in California, where they not only find lodging places, but also available food supplies. Considerable difficulty has been encountered in the control of rats that have taken up their residences in these trees. The methods commonly used in rat control are:

1. The protection or removal of rat food.
2. The killing of rats by poison and traps.
3. The removal of material which permits a refuge for rats.
4. The remodeling of all nonratproof buildings.
5. Closure of all openings in existing ratproof buildings.
6. Erection of ratproof buildings only.

and through the use of the following poisons:

1. Red squill.
2. Arsenic.
3. Thallium.
4. Barium carbonate.
5. Phosphorous.
6. Strychnine—"Formula as for Ground Squirrels."

Of course, the only permanent control measure lies in the provision of ratproof buildings. Second in importance is the removal of all possible supplies of rat food and destruction of all places that might provide harbors, particularly at garbage dumps and along waterfronts.

Rodents can not be considered in plague control without at the same time giving due consideration to fleas, for fleas are regarded as the actual vectors of plague. While the best way to control fleas is to control rodents, it would seem advisable to include some of the simple methods that have proved successful in the destruction of fleas upon domestic premises. These consist of fumigation, the use of oil emulsions and the application of chemical products such as flake naphthalene, as well as commercial fly sprays.

Cockroaches are of importance in the control of food poisoning, due to contaminated cream products, chiefly. It is known that cockroaches in food producing and dispensing establishments, such as bakeries and restaurants, may carry infectious material and contaminate such products as puddings, cream pies, cream filled pastries, and similar materials. Mice also are important as carriers of such infections. The devices used in the control of cockroaches consist chiefly of poisons, repellents, fumigants and trapping.

Sodium fluoride is the most commonly used poison and it generally proves effective. Powdered borax is also often attractive to cockroaches. Pyrethrum products may be used successfully and fumigation by gas may also be used. Trapping may be resorted to when other methods are not applicable. Generally, the use of sodium fluoride or borax will produce the most effective results.

Many individuals seem to have the belief that new methods in control of the common house fly have been developed since horse manure breeding places have become uncommon. As a matter of fact, there are no new methods in fly control. Flies may breed wherever there is warmth, food, moisture and protection. Probably the chief breeding places of flies today may be found at the rear of food-producing and food dispensing places in communities where ordinary sanitation is neglected. The successful control of flies depends entirely upon the sanitary control of the community. There is no magic formula that can be applied, and those communities that permit grossly insanitary conditions to exist will probably always suffer from this common and easily controlled pest. In cases where emergency control measures are indicated, the use of borax, chloride of lime and creosote oil may be necessary.

These are but a few of the many insect and rodent pests that are troublesome in rural areas. There are many more that might be discussed, but those mentioned are the cause of most difficulties in pest control as encountered by the average health officer.

SEASON'S GREETINGS TO PUBLIC HEALTH WORKERS

The staff of the California State Department of Public Health extends the greetings of the season to all public health workers in California. The year 1939 has brought added responsibilities and has increased the volume of public health activities within the state. Nevertheless, outstanding records in the maintenance of public health have been made, and the records show general advancement in public welfare. It is hoped that 1940 may bring prosperity and health to all public health workers and to the people of their respective communities. To all readers of the Weekly Bulletin, we extend sincere wishes for A MERRY CHRISTMAS AND A HAPPY NEW YEAR.

Half the spiritual difficulties that men and women suffer arise from a morbid state of health.—H. W. Beecher.

DISEASES REPORTABLE IN CALIFORNIA

REPORTABLE ONLY

Anthrax	Lymphogranuloma
Beriberi	Inguinale
Botulism	Malaria*
Chancroid	Pellagra
Coccidioidal Granuloma	Pneumonia (Lobar)
Dengue*	Relapsing Fever
Epilepsy	Rocky Mountain Spotted Fever
Fluke Infection	Septic Sore Throat
Food Poisoning	Tetanus
Glanders†	Trichinosis
Hookworm	Tularemia
Jaundice (Infectious)	Undulant Fever

ISOLATION OF PATIENT

Chickenpox	Ophthalmia Neonatorum
Dysentery (Amoebic)	Psittacosis
Dysentery (Bacillary)	Rabies (Animal)
Erysipelas	Rabies (Human)
German Measles	Syphilis
Gonococcus Infection	Trachoma
Influenza	Tuberculosis
Measles	Whooping Cough
Mumps	

QUARANTINABLE

Cholera†	Scarlet Fever
Diphtheria	Smallpox
Encephalitis (Epidemic)	Typhoid and Para-typhoid Fever
Leprosy	Typhus Fever
Meningitis (Epidemic)	Yellow Fever†
Plague†	
Acute Anterior Poliomyelitis	

* Patients should be kept in mosquito-free room.

† Cases to be reported to State Department of Public Health by telephone or telegraph and special instructions will be issued.

DR. SUTHERLAND LEAVES ORANGE COUNTY

Dr. K. H. Sutherland, who has been health officer of Orange County since 1928, has resigned, in order to become district health officer of Los Angeles County, in charge of the Compton district. He will be succeeded by Dr. Edward Lee Russell, who has been assistant health officer of Orange County for several years.

Dr. F. Lynn Smith has been appointed city health officer of Colfax to succeed Dr. E. E. Lundgaard.

With stupidity and sound digestion men may fret much; but what in these dull unimaginative days are the terrors of conscience to the diseases of the liver.—Carlyle.

MORBIDITY

Complete Reports for Following Diseases for Week Ending December 2, 1939

Chickenpox

564 cases: Alameda County 7, Albany 4, Berkeley 1, Oakland 21, Gridley 1, Colusa County 1, Richmond 1, Fresno County 5, Humboldt County 1, Inyo County 10, Bishop 34, Kern County 13, Bakersfield 1, Kings County 1, Los Angeles County 23, Burbank 6, Culver City 3, Glendale 1, Huntington Park 1, Long Beach 17, Los Angeles 23, Pomona 1, Redondo Beach 3, Santa Monica 2, Lynwood 1, Hawthorne 1, San Anselmo 1, San Rafael 18, Mendocino County 16, Monterey County 18, Carmel 1, King City 1, Monterey 8, Salinas 2, Orange County 20, Orange 3, Santa Ana 5, Placentia 1, Plumas County 3, Riverside County 8, Riverside 10, Indio 1, Sacramento County 3, Sacramento 16, San Bernardino County 3, Ontario 1, San Bernardino 1, San Diego County 4, Oceanside 7, San Diego 5, San Francisco 56, San Joaquin County 11, Stockton 41, Tracy 2, San Luis Obispo County 5, San Luis Obispo 1, Burlingame 4, Daly City 1, Redwood City 1, Santa Barbara 6, Santa Clara County 9, San Jose 15, Siskiyou County 4, Suisun 10, Sutter County 1, Tulare County 13, Lindsay 2, Tulare 2, Ventura County 4, Santa Paula 7, Ventura 1, Ojai 1, Yolo County 4, Yuba City 19, Fresno 5.

Diphtheria

40 cases: Los Angeles County 1, Los Angeles 8, Gardena 3, Seal Beach 1, Elsinore 3, Sacramento County 1, Colton 1, San Bernardino 2, San Diego County 2, Chula Vista 2, San Diego 5, San Francisco 1, Stockton 1, Tulare County 5, Dinuba 1, Tulare 1, Yuba County 1, Marysville 1.

German Measles

18 cases: Berkeley 1, Oakland 1, Richmond 1, Kings County 3, Los Angeles County 3, Long Beach 3, Los Angeles 1, Whittier 1, Hawthorne 1, Mill Valley 1, San Rafael 1, Riverside 1.

Influenza

20 cases: Richmond 1, Los Angeles County 3, Los Angeles 8, Laguna Beach 1, Sacramento 1, Stockton 1, San Mateo County 2, Santa Barbara County 2, Marysville 1.

Malaria

3 cases: Sacramento County 1, Sutter County 1, Yuba County 1.

Measles

165 cases: Albany 1, Berkeley 2, Richmond 1, Coalinga 1, Holtville 1, Kern County 1, Los Angeles County 1, Burbank 1, Long Beach 2, Los Angeles 6, Monrovia 1, Pasadena 2, San Fernando 3, Grass Valley 1, Orange County 2, Santa Ana 1, Sacramento 1, San Bernardino 1, San Diego County 2, National City 60, San Diego 55, San Francisco 3, Stockton 1, San Luis Obispo County 1, San Luis Obispo 2, Yreka 1, Tulare County 10, Oxnard 1.

Mumps

273 cases: Alameda County 2, Albany 1, Berkeley 6, Oakland 1, Butte County 3, Gridley 7, Richmond 4, Fresno County 1, Fresno 1, Reedley 1, Selma 1, Humboldt County 1, Kern County 2, Bakersfield 9, Kings County 4, Los Angeles County 11, Alhambra 1, Azusa 1, Compton 1, Glendale 2, Long Beach 7, Los Angeles 16, Montebello 2, Pomona 1, San Fernando 1, Whittier 1, Madera County 2, Madera 2, Mill Valley 8, Orange County 15, Anaheim 16, Santa Ana 1, Laguna Beach 1, Banning 1, Corona 1, Riverside 1, Sacramento County 1, Sacramento 4, San Bernardino 1, San Francisco 18, San Joaquin County 1, Stockton 4, San Luis Obispo County 5, Burlingame 1, Redwood City 2, San Bruno 1, San Mateo 4, Santa Barbara County 2, Santa Barbara 6, Santa Maria 1, Santa Clara County 6, Mountain View 11, Palo Alto 10, San Jose 1, Watsonville 1, Shasta County 1, Sonoma County 4, Tulare County 26, Dinuba 1, Ventura 1, Davis 10, Woodland 1, Yuba County 3.

Pneumonia (Lobar)

53 cases: Berkeley 1, Oakland 6, Kern County 1, Bakersfield 1, Los Angeles County 5, Los Angeles 18, Pasadena 1, Pomona 1, San Fernando 1, San Rafael 1, Mendocino County 1, Sacramento County 1, Sacramento 1, San Diego County 1, National City 2, San Diego 1, San Francisco 2, San Joaquin County 3, Stockton 1, Lompoc 1, Petaluma 1, Ventura County 1, Yuba County 1.

Scarlet Fever

189 cases: Oakland 3, Butte County 2, Chico 1, El Cerrito 1, Fresno County 1, Kern County 4, Kings County 7, Hanford 1, Los Angeles County 36, Alhambra 1, Arcadia 1, Burbank 1, El Monte 1, Glendale 4, Huntington Park 2, Inglewood 1, Long Beach 1, Los Angeles 38, Pomona 3, Santa Monica 1, Whittier 1, Lynwood 1, South Gate 2, Monterey Park 1, San Rafael 1, Mendocino County 1, Merced County 2, Pacific Grove 1, Orange County 1, Anaheim 1, Santa Ana 3, Corona 2, Sacramento 4, San Bernardino County 1, Ontario 1, San Diego County 3, National City 1, San Diego 4, San Francisco 8, San Joaquin County 1, Lodi 1, Stockton 1, San Luis Obispo 1, Burlingame 1, Daly City 1, Santa Barbara 3, Santa Clara County 1, Shasta

County 1, Benicia 1, Sonoma County 9, Tehama County 2, Tulare County 2, Dinuba 2, Visalia 1, Ventura County 3, Fillmore 2, Santa Paula 3, Ventura 2, Yolo County 2.

Smallpox

No cases reported.

Typhoid Fever

5 cases: Alameda 1, Albany 1, Hanford 1, Los Angeles County 1, Los Angeles 1.

Whooping Cough

159 cases: Alameda County 5, Oakland 4, Fresno County 5, Imperial 1, Kern County 7, Kings County 1, Los Angeles County 9, Azusa 2, Burbank 1, Claremont 1, Long Beach 4, Los Angeles 12, San Marino 1, Whittier 6, Lynwood 1, Fullerton 1, Santa Ana 2, Riverside County 4, Corona 1, Indio 2, San Bernardino 1, San Diego 6, San Francisco 33, San Joaquin County 1, San Mateo County 1, Redwood City 1, South San Francisco 2, Menlo Park 1, Santa Barbara 6, Palo Alto 8, San Jose 10, Yreka 1, Sonoma County 1, Petaluma 2, Santa Rosa 1, Tulare County 13, Ventura County 1.

Meningitis (Epidemic)

1 case: Hayward.

Dysentery (Amoebic)

3 cases: Los Angeles County.

Dysentery (Bacillary)

46 cases: Butte County 1, Fresno County 1, Fresno 1, Humboldt County 1, Susanville 1, Los Angeles 16, Pasadena 1, Mendocino County 1, Sacramento County 1, Sacramento 1, San Francisco 14; Stockton 1, Sonoma County 4, Ventura County 1, Davis 1.

Pellagra

2 cases: Los Angeles County 1, Glendale 1.

Poliomyelitis

16 cases: Oakland 1, Colusa 1, Reedley 1, Bakersfield 2, Burbank 1, Los Angeles 1, Madera 2, San Anselmo 1, Tulare County 1, Fillmore 1, Ojai 1, Davis 1, Marysville 1, California 1.*

Trachoma

2 cases: Pasadena 1, Tulare County 1.

Encephalitis (Epidemic)

3 cases: Fresno County 2, Hanford 1.

Paratyphoid Fever

6 cases: Los Angeles 4, San Luis Obispo County 2.

Typhus Fever

3 cases: Los Angeles County 1, Los Angeles 2.

Jaundice (Epidemic)

1 case: Lodi.

Undulant Fever

3 cases: Los Angeles 1, San Bernardino 1, Ventura 1.

Food Poisoning

11 cases: Orange County 3, San Francisco 7, California 1.*

Actinomycosis

1 case: Soledad.

Septic Sore Throat

1 case: Mendocino County.

Rabies (Animal)

2 cases: Madera County 1, Perris 1.

* Cases charged to "California" represent patients ill before entering the state or those who contracted their illness traveling about the state throughout the incubation period of the disease. These cases are not chargeable to any one locality.

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